COLONY OF MAURITIUS

DEPARTMENT OF AGRICULTURE

Twenty-second Annual Report

of the

Sugarcane Research Station

1951

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STAFF

Officer-in-charge ... . N. Craig, O.B.E. M.Sc.

Cane Breeding Division

Plant Breeder ... ... A. de Sornay, Dip. Agric. (Maur.), I.A.C., (Paris), B Sc. (Lond.)

Assistant Plant Breeder ... ... P. R. Hermelin, Dip. Agric. (Maur.)

Chemistry Division

Chemist ... ... Vacant.

Assistant Chemist ... ... S. M. Feillafé, Dip. Agric. (Maur.), A.C.R, (Maur.) (Acting as Chemist).

Scientific Assistant ... ... L. C. Figon.

Botany Division

Botanist ... ... Vacant.

Assistant Botanist ... . E. Rochecouste, Dip. Agric. (Maur.), B.Sc. (Lond.) (Acting as Botanist).

Scientific Assistant ... ... B. Nundloll.

Extension Service Division

Senior Field Demonstrator ... G. Mazery, Dip. Agric. (Maur).

Field Demonstrators ... ... J. Marot.
M. Sooltangos, Dip. Arric. (Maur)
G Avice.
D. Reetoo.

Clerk ... ... R. Bissessur.

RESEARCH ADVISORY COMMITTEE OF THE SUGARCANE RESEARCH STATION FOR THE YEAR 1951

Ex-officio :

The Director of Agriculture—*Chairman.*

The Chemist.

The Botanist.

The Plant Breeder.

Nominated by His Excellency the Governor :

Hon. D. Luckeenarain.

Hon. A. M. Osman, O.B.E.

Nominated by the Advisory Board of the Mauritius College of Agriculture :

Mr. G. P. Langlois.

Mr. P. Halais.

Nominated by the Sugar Industry Reserve Fund Committee :

Mr. Pierre de Sornay, *Chevalier de la Légion d'Honneur.*

Mr. F. North Coombes.

POLICY OF THE STATION

The policy of the Sugarcane Research Station is to improve the yield of sugar from every acre of land under cane and to extend the area capable of being planted in cane, in order to increase the total sugar output of the Colony.

The means by which this policy is carried out are :—

(*a*) breeding and testing of new canes with the object of producing varieties yielding more sugar to the acre and resistant to the main pests and diseases of cane in Mauritius ;

(*b*) breeding of early-maturing, high-yielding canes, so as to increase the area of cane which can be harvested at the time of maximum sugar content ;

(*c*) breeding of specialised varieties of cane for different localities with the objects of extending the area capable of cultivation in cane and raising the yield of areas at present marginal ;

(*d*) study of the effects of cultural practices and fertilizer treatment on the yield of cane, and dissemination of the knowledge obtained from such studies ;

(*e*) study of the physiology of the cane plant, in order to ascertain the factors associated with high yield and resistance to pests and diseases ;

(*f*) investigations into the control of weeds of cane fields, and dissemination of the information obtained from such studies ;

(*g*) prapaganda and demonstration of up-to-date methods among small planters, with the object of raising their yields to the level attained by the estate and the large planters.

W. Allan,
Director of Agriculture.

30th November, 1951.

Annual Report of the Sugarcane Research Station for 1951

Introduction

Sugar production in 1951 amounted to nearly 484,000 metric tons, which is some 27,000 tons more than the record crop of the previous year. This is the fifth record crop in five successive years increasing from about 348,000 tons in 1947 to the present one of 484,000 tons. This crop was made from 159,638 arpents harvested out of total plantations covering about 169,109 arpents. This shows that over 94 per cent of the lands planted to sugarcane are havested each year, and that the yield of sugar from each acre harvested was 3·03 metric tons.

This high sugar production was achieved in spite of weather conditions which were not altogether favourable for sugar production. Rainfall for the period November 1950 to December 1951 was deficient when compared with the average, but there was generally more rain during the crop months than normally. At the same time, the temperature during the winter months of May to October (inclusive) was above normal. These conditions then were unfavourable for ripening the crop, but favourable for continued vegetative growth, in spite of the heavy arrowing of the cane earlier in the year. Consequently the yield of cane in the field was very high, averaging 27·3 tons per arpent against 24·6 tons per arpent in 1950. The extraction, however, was much lower being 11·11 per cent (approximately) against 12·27 per cent in the previous year. In all, some 4,355,101 tons of cane were crushed during 1951 compared with 3,719,674 tons in 1950, and as a result the crushing period was very extended, the first mill starting crushing on the 26th June, 1951 and the last one closing down on the 18th January, 1952. Meteorological data are given in the following table :—

RAINFALL IN INCHES

Months	*Experimental Station Pamplemousses*		*Central Experimental Station Reduit*		*Royal College Curepipe*		*Temperature Departure from Normal*
	Registered	*Normal*	*Registered*	*Normal*	*Registered*	*Normal*	*°Centigrade*
November 1950 ...	0·18	2·13	4·77	2·33	3·79	5·71	−0·4
December 1950 ...	1·86	4·91	3·58	6·37	12·00	9·71	−0·2
January 1951 ...	4·86	9·56	12·94	10·32	20·45	16·33	+0·1
February 1951 ...	3·52	8·74	5·08	10·95	17·86	17·28	−0·8
March 1951 ...	9·08	9·32	12·12	11·94	12·69	19·31	−0·7
April 1951 ...	3·67	5·96	6·58	5·41	7·73	12·39	−0·6
May 1951 ...	7·35	4·48	3·60	4·24	8·29	9·86	+0·1
June 1951 ...	2·15	3·43	4·50	3·11	13·26	7·47	+0·1
July 1951 ...	1·85	2·93	2·89	2·75	6·37	8·57	+0·7
August 1951 ...	1·85	2·59	3·08	2·47	11·66	7·79	+0·2
September 1951 ...	2·69	1·83	1·37	1·71	7·41	5·78	+0·2
October 1951 ...	2·24	1·95	4·70	1·91	5·11	4·52	+0·4
November 1951 ...	2·15	2·13	3·50	2·33	5·61	5·71	−0·2
December 1951 ...	0·87	4·91	0·85	6·37	3·07	9·71	+0·1
TOTAL	44·32	64·87	69·56	72·21	135·30	140·14	−0·6

The cane variety position remains much the same as in the previous year, with M. 134/32 retaining its preponderance over all other varieties. For the 1951 crop, this variety occupied 91·7 per cent of all cane lands, so that other varieties were of very minor importance. The variety M. 423/41 released for general planting came in for a certain amount of criticism became of its comparatively low juice quality. It would not be justified to condemn the variety because of this, in view of the fact that all juices were abnormally poor. M. 423/41 is a variety of great vegetative vigour, and as such might be expected to respond to the adverse maturing conditions more definitely than less vigorous canes. A further variety was released during the year, Ebene. 1/37, which was bred at Ebene, an annexe of Highlands Sugar Estate. This variety is particularly suited to the wetter parts of the island, where it seems to be better than M. 134/32 both in tonnage per arpent and in extraction. Some 36,000 canes of this variety were distributed to planters for propagation. The testing of four Barbados varieties imported in 1945 is in an advanced stage, and the question of the release of certain of these varieties will probably be discussed in the near future.

With these new and projected releases of new varieties and with the cane breeding work being continued at high pressure, it is hoped that the almost complete dependence of the sugar industry on one single cane variety, a source of great weakness, will come to an end. In view of the long ratooning system practised in Mauritius, however, it will be some years before any new variety will be able to become of equal importance as the M.134/32.

Work in the Chemistry Division has been continued more or less on a maintenance level, because of staff, whilst in the Botany Division practically all work came to a standstill as the post of Botanist was vacant and the Assistant Botanist was absent throughout the year in England, where he was reading for the B.Sc. (Special) Degree of the London University.

The work of the Field Demonstrators continued at fairly high pressure, throughout the year, in spite of the fact that one Field Demonstrator was transferred to the Agricultural Division in September and another was called upon to help the Central Board during the crop season because of the lack of Test Chemists in that Division of the Department. It would appear that the work of this Extension Service is making itself felt, and it may not be without significance that whereas the millers produced 1·2 tons of cane per arpent in 1951 more than in 1950, the corresponding figure for planters was 4·1 tons of cane. There is no doubt that many small planters are showing increased interest in up-to-date agricultural methods, such as the more rational use of fertilizers, the pre-planting treatment of cuttings with aretan and weed-control by means of selective weed-killers. There is obviously still very much room for improvement, but it may be hoped with some confidence, that the rate of improvement will increase as the planters gain more confidence in the advice given to them by the Field Demonstrators.

Three meetings of the Sugarcane Research Station were held during the year, the first to meet Mr. P. E. Turner, and the others to discuss the Annual Report for 1950 and research projects for the future.

A number of distinguished visitors were received from the United Kingdom, the British West Indies, France, Egypt, Morocco, Madagascar and Reunion, with all of whom the various aspects of the work of the Station were discussed. Such visits are of great value to an institution such as this, particularly in view of its isolated situation.

Staff

The staff position remained as unsatisfactory as in previous years, neither of the head posts in the Chemistry or Botany Divisions having been filled. Obviously such a state of affairs must have a very serious repercussion on the quality of the research work performed. As an instance, it may be remarked that some four years ago this Colony was well to the fore respecting research in weed-killers, but it has rather fallen behind now.

The chief staff movements were as follows:—

Mr. E. Rochecouste, Assistant Botanist, was on study leave reading for the special degree of B.Sc. in the London University.

Mr. G. Mazery, Senior Field Demonstrator, returned from vacation leave in February, when Mr. Marot reverted to his substantive post of Field Demonstrator.

Mr. C. Figon was appointed Scientific Assistant in the Chemistry Division as from 9th April.

Mr. I. Fakim was appointed Scientific Assistant, Botany Division in June 1951 and was promoted to the Land Settlement Division in September.

Mr. R. Bissessur was appointed temporary clerk in August.

Mr. B. Roy, Field Demonstrator, was transferred to the Agricultural Division in September, as Agricultural Officer.

Mr. B. Nundloll, Assistant Field Officer-in-charge Cultural Methods was appointed Scientific Assistant in the Botany Division.

Detailed reports of the work performed in the four divisions of the Sugarcane Research Station follow. These show that, in spite of the serious shortages of staff, useful work has been performed, especially in the Cane Breeding Division. In conclusion, I would like to pay a tribute to the way in which all officers have carried on in spite of the difficulties, and to thank them for their hearty co-operation.

N. CRAIG,
Deputy Director of Agriculture
and Officer-in-charge S.R.S.

PART I.—CANE BREEDING DIVISION

Cane Breeding—M./51 Series

Arrowing was profuse and widespread in 1951. Field data collected by the larger estates showed that M.134/32, which holds pride of place in the Colony, has arrowed to the extent of 85 per cent in some localities.

Tassels of parent varieties which seldom flower, such as R.P. 8, B.H. 10/12 and Black Tanna, were available in the varietal nurseries. The first variety has, as far as is known, not been arrowing since 1934, during which year crosses made with it as female parent produced M. 112/34 and Ebene 1/37.

Two B.H. 10/12 arrows were obtained in an experimental plot at Réduit, one of which protruded normally and was used as female; the canes which produced these arrows were of medium length. It seems appropriate at this juncture to mention that 40 months old B.H. 10/12 canes, 20 feet long, growing in a nearby field have not flowered, a fact which may indicate that senescene is not nccessarily conducive to flower initiation in this variety.

Several B.H. 10/12 canes showed advanced signs of arrowing at Mon Desir Estate, Black River, but only two arrows were obtained for crossing. The other canes reverted to the vegetative state and gave rise to the "bunch top" condition. Lantern crosses were made on the spot, M. 63/39 and M. 423/41 being used as male parents. A few other B.H. 10/12 arrows were obtained from an odd ratoon stool growing in the border of a field of M. 112/34 at Rich Fund and transported to Réduit for crossing.

S.C. 12/4, which had not flowered for the past five or six years, arrowed quite prolifically at Réduit in 1951, and was used for mating with a large number of female varieties with the view of breeding rich seedling canes. Black Tanna, the only one of the Tanna varieties producing a few seedlings per cross, arrowed to a slight extent in the breeding plot at Réduit, but yielded sterile fuzz on being crossed with several varieties.

Cross pollination was carried out at Réduit and Pamplemousses during the period June—July. The crosses made are detailed as hereunder:—

TYPE OF CROSS

	Lantern	*Bag*	*Open*	*Totals*
Reduit	136	0	29	165
Pamplemouses ...	40	21	31	92
TOTALS ...	176	21	60	257

The hybridization work involved a wider range of parental types than the previous years. More emphasis was laid on crosses of the fourth—nobilized glagah type in view of the commercial popularity attained by such varieties as M. 134/32 and M. 112/34.

The blending of desirable commercial characters such as high sugar content with vegetative vigour is one of the goals in view, and the cross M. 112/34 × M. 63/39 appears particularly promising in this respect. The number of synthetised parents carrying several blood-lines variants has increased of late years and a wide range of new combinations is now possible.

The breeding policy has remained the same as for the past years. The main goals towards which the breeding work is directed are the production of :—

(*a*) early maturing varieties ;

(*b*) rich and high yielding canes for the poor leached soils of the high rainfall areas. Particular attention is being given to high sucrose content and every effort is being made to incorporate this quality into the home-bred varieties to enhance their commercial value.

(*c*) canes to meet other specific needs.

Selfings.—Selfing were made in view of :—

(*a*) envolving some elite breeding stocks, and ;

(*b*) testing the self-sterility of certain male parent varieties to ensure whether they can be used as female parents in differential crosses.

Varietal Nurseries.—New varieties selected from second—trials for breeding purposes have been added to the breeding plots at Reduit and Pamplemouses.

The seed-bearing fuzz was very prolific: 82,370 seedlings have been raised, as compared with 23,000 in 1950. Outbreaks of damping-off disease occurred in some of the seedlings batches at Réduit and Pamplemousses resulting in the lost of many seedlings, but without any serious effects owing to the fuzz prolificity. Blocks of soil bearing infested seedlings had to be removed before the disease had made much headway in affected pans. The soil used for planting the fuzz had been steam sterilised. It is intended to water the seedling pans with weak Aretan solution henceforth as a preventive measure against the disease. Research is being conducted to investigate the adequate concentration and the best time of watering the soil to prevent the occurrence of dumping-off and to ensure normal seedling growth.

The table below shows the extent of the breeding work, the number of seedlings potted and the number planted in the field :—

Nature of cross	*No. of crosses made*	*No. of seedlings potted*	*Number of seedlings planted in the field*		
			C.E.S.	*P.E.S.*	*H.E.S.*
2nd. Nobilised *S. Spontaneum*	1	625	—	—	—
3rd. Nobilized *S. Spontaneum*	–	—	—	—	—
4th. Nobilised *S. Spontaneum*	39	4,129	909	687	203
5th. Nobilised *S. Spontaneum*	17	3,109	1,012	590	275
6th. Nobilised *S. Spontaneum*	1	—	—	—	—
Crosses involving several *Saccharum* species	196	26,900	8,414	8,375	9,510
Selfings	3	531	9	160	—
TOTAL ...	257	35,294	10,344	9,812	9,988

Total number of seedlings planted	30,144
do. obtained	82,370

Transplanting to pots commenced in August, and a total of about 35,000 seedlings has been potted out. The seedlings made good growth in the nurseries due to favourable weather.

About 4,000 seedlings from various combinations were, on request, supplied to Mr. G. Rouillard, agronomist, for potting out and planting on an estate of the superhumid zone. This was possible due to the number of seedlings raised being largely in excess of requirements, but it cannot be regarded as a recurrent policy.

First Year Trials

(i) *Virgins—M. /51 Series*—The field plantations of the 1951 seedlings commenced at the beginning of December, but could not be completed at the end of the year due to abnormally dry weather. Very cloudy days held out promise of copious rains, but a drought was experienced until the end of December.

Seedlings transplanted in the field total over 30,000, a figure well above the maximum planted so far.

As usual, marginal and central rows of single-eyed setts of M. 134/32 have been included in the seedling plots. B.H. 10/12 and Ebene 1/37 setts have, in addition, been planted in some of the plots containing seedlings bred from these parental varieties.

Progeny trials have been laid down at the Experimental Stations to assess the value of certain crosses. Each trial consists of five different crosses replicated twenty times. There are 100 seedlings per cross and the families have been allocated at random to the blocks in groups of 5 seedlings. This method of layout is probably better than the one formerly adopted in which the consecutive seedlings belonged to different families. The control variety, M. 134/32, has been included in the trials, there being 5 consecutive stools per block.

It is intended to reinclude progeny-testing as a routine measure, as it provides a useful guide for the purpose of establishing the value of crosses. The ordinary method of testing seedlings, i.e. planting 200—300 annually in the same plot may, however, serve the same purpose, since the plantings are distributed in space and time.

Sixty seedlings, occurring as rogues in several fields at Réduit, have been transplanted to pots and subsequently planted out in a special plot. Their location in the field suggests that they are derived from natural crosses between the 1949 seedlings or from selfings thereof.

(ii) *Virgins—M. /50 Series.*—The seedlings from the more advanced plots at Pamplemousses were selected in November and 72 retained and planted in second-trials. The populations have been uprooted to make room for the 1951 seedlings. The other plots will be selected in ratoons.

It must be remarked that November does not appear a suitable month for selecting seedlings, the populations displaying a lower Brix variability than when examined during the period August—September. Late selection has also the disadvantage of preventing the detection of early maturers.

(iii) *Virgin—M. /49 Series.* The seedlings at Hermitage were selected in August, and 110 seedlings retained for testing in second-trials. The populations have been uprooted after harvest. There were very few gaps due to seedling failures and, therefore, the assessment of parental lines will be more trustworthy.

(iv) *Ratoon—M. /49 Series.* Selection from the 1949 ratoon populations were made in August at Réduit and Pamplemousses and 196 seedlings selected and planted direct in second-trials.

Second Year Trials

1. *Trials laid down.*—Four large-scale trials consisting of 48 sub-trials, including 378 selections, have been laid down to test seedlings of the M. /49. and M. /50 series against M. 134/32. The newly released variety Ebene 1/37 has also been included as control in the Hermitage trials.

2. *Trials harvested.*—Twenty-eight second-trials have been harvested in 1951, 5 in plant cane, 20 in first-ratoon, and 3 in second-ratoon. Thirty nine varieties have been selected therefrom for further trial and 7 for breeding.

Following the search for early maturers, samples for reading the Brix were taken from one block of second-trials in July. The second block was sampled during the period September—October as usual. Both blocks could not be sampled at the same time due to pressure of word in other directions, but it is intended to do so as soon as the Cane Breeding Division will have its full complement of Officers.

Several varieties derived from certain crosses had a higher Brix than the control variety early in the crushing season, but the high Brix may be due to a high proportion of glucose in the juice. Reducing sugar determinations should, therefore, be of the utmost value at this stage of the breeding work.

Progeny involving Co. 281 blood showed a high frequency of seedling varieties with a high Brix but, unfortunately, such varieties have thin stalks and arrow too freely. They may, however, be potential parents for the production of early maturing canes.

A prominent feature of the second-trials' results is the reduction in the number of selections from first to second ratoon. Out of 32 trials containing an average of 10 varieties, 40 varieties have been selected in second-ratoon, as against 69 which would have been chosen in first-ratoon had selection been based on first-ratoon's results only. These results show how it is important to persue the study of the ratooning qualities of newlybred varieties up to the second-ratoon stage prior to including them in third-trials.

Third Year Trials

1. *Trials laid down.*—Six trials have been planted at Hermitage to test 28 varieties of the M. /44 series against M. 134/32 and Ebene 1/37 These trials have been laid down in July, the best planting month in the locality, and the canes had a very good start. The different varieties included therein are displaying great variablility and selection should be very interesting. No third trials have been planted at Reduit and Pamplemouses.

2. *Trials harvested.*—Fourteen trials have been harvested during the crop, six in plant cane, 7 in first-ratoon and one in second-ratoon. Of the fifteen varieties selected and planted in propagation plots, M. 31/45 is by far the most promising. This variety had already been selected the previous year, but its performance in ratoon at Hermitage was studied to confirm its suitability for high rainfall areas. It appears in Variety trials at Valetta and Beau Climat (Britannia), both in the super-humid zone. It has given very promising results in various tests. It has outyielded M. 134/32 by a considerable margin and crops well in the wetter localities. It has very good juice and is a non-tasseler.

M. 31/45 was bred from the cross M. 134/32 × M. 99/34, from which are also derived varieties such as M. 63/39, M. 76/39 and M. 423/41. The great frequency of high yielding but poor juice quality seedling canes in the progeny of crosses of the above type would demand the jettison of such combinations. However, when one bears in mind, that only one out of several thousand seedlings may be outstanding, the potentiality of these crosses should be exploited.

The other promising varieties which have been planted in propagation plots belong to the M. /43 and M. /44 series. Emphasis has been placed on quality when selecting them for inclusion in variety trials on estates.

Variety Trials

1. *Introductory remarks.*—Good growing weather has, on the whole, been experienced for the past six years. The island has escaped a major visitation by tropical cyclones, and no drought has affected the territory. From several standpoints, therefore, these favourable climatic conditions have been detrimental to the proper testing of certain qualities of the newly produced varieties. These conditions may, in addition, have masked certain diseases which would otherwise have been more prevalent.

Rainfall in 1951 was abundant and, as a rule, well distributed with the result that cane yields have soared to high levels. From the point of view of maturation, however, the year under review was one of the worst on record, but it was excellent for assessing juice quality, particularly at the beginning of the crushing season.

As the breeding work is now dominated by the need for producing early maturing varieties, maturity tests have been made with the hand refractometer on the Barbados varieties all over the island. The writer wishes to thank Messrs. P. Halais and G. Rouillard, without whose services it would have been very difficult to take Brix samples from all

variety trials. The sugarcane crop is now spread over a longer period and commences earlier because of the heavy tonnage. It is imperative, therefore, to find early maturing varieties capable of having better juice than M.134/32 early in the crushing season.

There has been some change in connection with the sampling of canes from variety trials for analysis. Instead of taking twelve whole canes as usual, twelve half-canes (tops and bottoms) were sampled at random from the experimental rows of all trials. This method should give more representative samples.

The use of Addiators for rapidly recording plot yields considerably reduced computational work. Another way in which the use of these machines is advantageous is that the number of bundles weighed per plot is constant and, therefore, weighing errors tend to be the same for all plots.

2. *Trials laid down.*—Only three variety trials have been planted to test new seedling varieties of the M./41, M./42 and M./43 series, the most promising of which being M.296/41, M.311/41, M.126/42 and M.152/43. The control varieties are M.134/32 and Ebene 1/37.

M.296/41 appears suited to high rainfall conditions and M.311/41 crops well at Medine under irrigation. M.126/42 is an extremely vigorous variety, but it is as yet too early to say whether its sucrose content compares favourably with that of M.134/32. M.152/43 does not call for special comments.

3. *Trials harvested.*—Fifty nine trials have been cut and weighed during the crop. Plant cane trials numbered 8 and ratoon trials 51. Four trials were cut by estates without the plot yields being recorded.

Variety trials harvested are detailed under seven subsections as follows :—

(a) Barbados varieties.—A large number of trials containing B.3337, B.34104, B.37161, and B.37172, has been reaped during the year. Most of these trials were in first and second ratoons.

The average results obtained with these varieties during the period 1948–1951 are given in the following tables.

		Barbados Varieties			
		Virgins (Mean of 16 Trials)	*1st Ratoon (Mean of 17 Trials)*	*2nd Ratoon (Mean of 16 Trials)*	*Average (49 Tests)*
Tons Cane per arpent	B. 3337	35·8	37·5	37·9	37·1
	M. 134/32 ...	32·2	30·8	29·7	31·0
	Diff.	+ 3·6	+ 6·7	+ 8·2	+ 6·1
	Percent	11.4	21·7	27·6	19·6
Juice Purity percent	B. 3337	84·8	87·9	85·6	86·2
	M. 134/32 ...	83·3	86·5	85·5	85·1
	Diff.	+ 1·5	+ 1·4	+ 0·1	+ 1·1
C.C.S. percent Cane	B. 3337	12·3	12·9	12·0	12·5
	M. 134/32 ...	12·5	13·4	12·9	13·0
	Diff.	− 0·2	− 0·5	− 0·9	− 0·5
Tons C.C.S. per arpent	B. 3337	4·36	4·82	4·57	4·59
	M. 134/32 ...	4·12	4·24	3·79	4·06
	Diff.	+ 0·24	+ 0·58	+ 0·78	+ 0·53
	Percent	5·8	13·7	20·6	13·0

Barbados Varieties—*continued*

		Virgins Mean of 20 Trials	*1st Ratoon (Mean of 21 Trials)*	*2nd Ratoon (Mean of 16 Trials)*	*Average (57 tests)*
Tons cane per arpent	B. 34104	36· 3	33· 7	34· 9	35· 0
	M. 134/32 ...	34· 2	30· 9	30· 4	31· 9
	Diff.	+ 2· 1	+ 2· 8	+ 4· 5	+ 3· 1
	Percent	6· 3	9· 2	14· 8	9· 6
Juice Purity percent	B. 34104	85· 9	86· 8	84· 9	86· 0
	M. 134/32 ...	84· 2	85· 3	85· 5	85· 0
	Diff.	+ 1· 7	+ 1· 5	− 0· 6	+ 1· 0
C.C.S. per-cent Cane	B. 34104	13· 2	12· 8	12· 4	12· 9
	M. 134/32 ...	12· 7	13· 1	12· 9	12· 9
	Diff.	+ 0· 5	− 0· 3	− 0· 5	0· 0
Tons C.C.S. per arpent	B. 34104	4·85	4·39	4·38	4·55
	M. 134/32 ...	4·40	4·11	3·90	4·15
	Diff.	+ 0·45	+ 0·28	+ 0·48	+ 0·40
	Percent	10· 2	6· 8	12· 3	9· 6

		Virgins (Mean of 21 Trials)	*1st Ratoon (Mean of 21 Trials)*	*2nd Ratoon (Mean of 16 Trials)*	*Average (58 Tests)*
Tons cane per arpent	B. 37161	38· 9	34· 4	35· 4	36· 3
	M. 134/32 ...	34· 2	30· 9	30· 0	31· 9
	Diff.	+ 4· 7	+ 3· 5	+ 5· 4	+ 4· 4
	Per Cent	13· 7	11· 3	17· 9	13· 9
Juice purity per cent	B. 37161	85· 2	86· 3	86· 5	86· 1
	M. 134/32 ...	83· 8	85· 4	85· 6	84· 9
	Diff.	+ 1· 4	+ 0· 9	+ 0· 9	+ 1· 2
C.C.S. per cent cane	B. 37161	12· 6	12· 8	12· 9	12· 8
	M. 134/32 ...	12· 5	13· 1	12· 9	12· 9
	Diff.	+ 0· 1	− 0· 3	0· 0	− 0· 1
Tons C.C.S. per arpent	B. 37161	4·97	4·43	4·65	4·69
	M. 134/32 ...	4·33	4·12	3·85	4·19
	Diff	+ 0·64	+ 0·31	+ 0·80	+ 0·50
	Per cent	14· 8	7· 5	20· 8	11· 9

		Virgins (Mean of 20 Trials)	*1st Ratoon (Mean of 22 Trials)*	*2nd Ratoon (Mean of 17 Trials)*	*Average (59 Tests)*
Tons cane per arpent	B. 37172	35· 8	32· 9	34· 9	34· 4
	M. 134/32 ...	32· 8	32· 5	30· 2	31· 4
	Diff.	+ 3· 0	+ 0· 4	+ 4· 7	+ 3· 0
	Per cent	9· 1	1· 0	15· 7	9· 7
Juice Purity per cent	B. 37172	85· 6	86· 6	86· 2	86· 2
	M. 134/32 ...	83· 0	85· 4	85· 6	84· 7
	Diff.	+ 2· 6	+ 1· 2	+ 0· 6	+ 1· 5
C.C.S. per cent cane	B. 37172	12· 8	12· 9	12· 8	12· 8
	M. 134/32 ...	12· 7	13· 1	12· 9	12· 9
	Diff.	+ 0· 1	− 0· 2	− 0· 1	− 0· 1
Tons C.C S. per arpent	B. 37172	4·60	4·27	4·43	4·43
	M. 134/32 ...	4·16	4·13	3·88	4·07
	Diff.	+ 0·44	+ 0·14	+ 0·55	+ 0·36
	Per cent	10· 6	3· 4	14· 2	8· 8

A detailed consideration of the data obtained leads to the following conclusions :—

B. 3337.—This variety is the best yielder of the four B. canes. It crops particularly well under superhumid conditions and appears a good ratooner. It produces very regular stands and arrows very little. It labours under one disadvantage: its sucrose content is lower than that of the control variety M. 134/32, and it tends to have poor juice qualities in some cases. It is very likely medium maturing like M. 134/32. It appears susceptible to gumming disease, but only leaf symptoms have been seen so far.

B. 34104.—It appears to be a good cane for all-round purposes. It ratoons well and has good juice. Its performance in various ecological areas does not call for special comments, except that it is probably drought-resistant. It is thin and arrows profusely. Its susceptibility to Leaf Scald in British Guiana may militate against its being recommended for commercial growing.

B. 37161.—This variety is, from many standpoints, probably the most promising of the four B. varieties. It is a high yielder suited to a diversity of environmental conditions. Its ratooning qualities are better than at first expected despite its poor tillering. It does well in the wetter localities, and its performance under dry conditions seems to approach that of M. 134/32. It arrows fairly prolifically. It is a rich cane and, apparently, matures earlier than M. 134/32. One of its defects is that it gas not a good canopy and its growth habit is rather unsatisfactory. Its stalks are of good diameter.

B. 37172.—This cane has given good results on the whole. It appears rather unsuited to high rainfall areas, but crops well in the humid and dry localities. It performed better than M. 134/32, in the subhumid zones, but information gathered up to now is too meagre to allow of its resistance to drought being gauged, especially bearing in mind that there has been really so severe dry spell during the period it was tested. It is a rich variety and, like B. 37161, is early maturing. It has a very erect habit, even in plant cane, and its cultivation will, in all probability, be more expensive than that of M. 134/32. It ratoons well and flowers less than the control variety.

Summarising the preceding data, it may be said that, of the four above Barbados varieties, B. 37161, and B. 37172 appear to have a commercial future, while B. 3337 and B. 34104 may not be recommended for release because of their defects.

(b) *M. 213/40.*—It was decided to collect further data of its juice qualities, which are uncertain and erratic, and of its performance in older ratoons.

The average results obtained so far show that M. 213/40 has an inferior juice offsetting a high yield of cane.

Cases of stem deterioration have again been noticed on this variety during the crop. Healthy and diseased canes from a variety trial at Palmyre were sampled for analysis, the results showing that the juice is badly affected by the disease. The data obtained are however, too fragmentary for publication. As for the previous year, nearly 100 per cent of the arrowed canes showed stem necrosis.

(*c*) *M. 423/41.*—The yield figures collected in third and fourth ratoons in 1951 are as follows :—

		3rd Ratoon (Mean of 4 tests)	*4th Ratoon (Mean of 2 tests)*
Tons cane per arpent	M. 423/41	34· 8	37· 0
	M. 134/32	30· 7	32· 3
Juice purity %	M. 423/41	84· 6	81· 6
	M. 134 32	86· 3	84· 4
C.C.S. % Cane	M. 423/41	13· 0	11· 6
	M. 143/32	13· 1	12· 8
Tons C.C.S. per arpent	M. 423/41	4·50	4·25
	M. 134/32	4·04	4·11

It can be inferred from the above results that :—

(i) M. 423/41 appears to be a sound ratooner,

(ii) that its juice qualities were inferior to those of M. 134/32 in 1951.

Arrowing was profuse in 1951, even in the case of young short canes.

(*d*) *Ebene 1/37.*—The average results obtained with this variety since it has been included in variety trials, are appended below :—

		Virgins (Mean of 7 trials	*1st Ratoon (Mean of 3 Trials)*	*2nd Ratoon (Mean of 7 Trials)*	*Average (17 tests)*
Tons cane per arpent	Ebene 1/37 ...	32· 6	37· 7	35· 7	34· 8
	M. 134/32 ...	31· 1	32· 7	32· 7	32· 0
	Diff.	+ 1· 5	+ 5· 0	+ 3· 0	+ 2· 8
Juice purity per cent	Ebene 1/37 ...	83· 3	83· 2	87· 1	84· 8
	M. 134/32 ...	83· 7	80· 1	84· 8	83· 8
	Diff.	− 0 4	+ 3· 1	+ 2· 3	+ 1· 0
C. C. S. per cent Cane	Ebene 1/37 ...	11· 9	12· 7	13· 4	12· 6
	M. 134/32 ...	11· 9	11· 1	12· 9	12· 2
	Diff.	0· 0	+ 1· 6	+ 0· 5	+ 0· 4
C. C. S. per arpent	Ebene 1/37 ...	3·79	4·83	4·79	4·38
	M. 134/32 ...	3·61	3·66	4·25	3·88
	Diff.	+ 0·18	+ 1·17	+ 0·54	+ 0·50

The above results show, *inter alia*, that Ebene 1/37 is a good ratooner and that its juice is excellent.

(e) New M. Varieties.—Of the new home-bred varieties tested on estates, the most promising ones are probably M.11/43 and M.31/45. The former appears to be an early maturing variety having given much higher juice purity and extraction figures than M.134/32 in the North at the end of July. Its sugar yield has been, so far, equal to or superior to that of the control variety. It seems, unfortunately, susceptible to drought.

M.31/45 has already been mentioned in the section dealing with third-trials (page 8). This variety has given very good results in plant cane in variety trials in virgins in superhumid areas. As already reported, its juice compares very favourably with that of M.134/32.

Stocks of both varieties have been built up at the Experimental Stations and it is hoped that ample planting material will be available for laying down more experiments on estates in 1952.

Other varieties showing some promise are M.311/41, which does particularly well under irrigation at Medine, and M.126/42, a very vigorous complex hybrid bred from M.134/32. M.296/41 derived from S.C. 12/4 appears in some of the trials. M.152/43, although good, will probably not be serious competitor with the other varieties.

(f) B.H. 10/12.—This old variety, included in two trials at Black River, gave as good results in plant cane and first-ratoon at Belle Isle and in plant cane at Mon Desir as M.134/32.

The trial at Mon Desir was, unfortunately, marred by a rat infestation.

(g) The split-plot trial at Bénarès was harvested in second ratoon. The data obtained for three successive crops are too erratic to warrant publication.

Release of Ebene 1/37

The variety Ebene 1/37 was added to the list of approved varieties. About 36,000 canes have been distributed to planters, planting material being obtained from Highlands S.E. The distribution took place under the supervision of the Extension Service Division of the S. R. S. All applications for canes were made direct to the Officer-in-charge, S. R. S.

Other Investigations

1. Control of Arrowing

(a) Fertilizer treatment.—The experiment commenced in 1949, to investigate the effects of high phosphate dressings, in combination with nitrogen, on flower induction in B.H. 10/12, was continued. Two canes of medium height in a plot which had received phosphatic guano at the rate of 800 kgs. per arpent arrowed towards the middle of the flowering season. One of the arrows protruded fully and was used for crossing with M.423/41 as male parent.

The experiments is being continued in ratoon at Réduit to determine whether the high phosphate application has any specific effect in inducing arrow formation in B.H. 10/12.

A second experiment has been laid down on B.H. 10/12 ratoons at Pamplemousses to study the results of applying phosphates in the absence of Mitrogen, and under different climatic conditions.

(*b*) *Injection experiment*—Juice was extracted from tops of several varieties containing rudimentary inflorescences and injected into R.P. 8 and B.H. 10/12 canes by two methods :—

(i) *Leaf injection.*—The method used is that described by Evans *. The flap set free was dipped into juice contained in a bamboo pot attached to a pole. Juice absorbtion was fairly good.

(ii) *Stem injection.*—This was effected by means of glass syphons ; very little absorption took place.

Both methods gave negative results. Juice applied direct to the soil round a few R.P. 8 stools had also no effect on arrowing.

(*c*) *Auxin application.*—Several M. 134/32 tops bearing very young inflorescences were cut transversely below the growing point after removing the leaf-sheaths, placed vertically on agar-agar contained in Petri dishes and kept in a refrigerator for about 48 hours. Cores were removed from B.H. 10/12 canes with a cork borer a little below the growing point, the agar agar was inserted into the holes, and the openings immediately closed with paraffin wax.

The experiment gave negative results.

(*d*) *Planting under waterlogged conditions*—R.P. 8 and B.H. 10/12 have been planted in marshy land at Pamplemousses in May 1951. Recruiting in some of the rows was made by planting sprouted single-eyed setts from the nursery.

(*e*) *Planting in superhumid localities.*—A few R.P. 8 stools have been planted at Val Riche, Bel Ombre S.E., at a high altitude. Fifty holes of B.H. 10/12 have been planted at Hermitage where the annual rainfall totals 125 inches. About $\frac{1}{4}$ of an arpent of B.H. 10/12 has been planted at Rich Fund where this variety is known to arrow fairly frequently.

2. *Aretan as a preservative for male arrows.*—The investigations initiated the previous year have been continued on a larger scale in 1951, and showed conclusively that 0·03 per cent Aretan solution can be used as a substitute for $S O_2$ solution. The experiment comprised a fairly wide range of parantal varieties.

3. *Effect of source of planting material on cane yield.*—The 5 × 5 Latin Squares laid down at the Experimental Stations to determine whether a significant difference in yield of cane ean be correlated with the source of planting material of M. 134/32, were harvested in first-ratoon. The results showed that, in the case of the Hermitage trial, the cuttings obtained trom Hermitage gave a significantly lower yield of cane per arpent than that from the cuttings from St. Antoine S.E. ; the differences between the other sources were not significant. No statistical difference in yield of cane could be found between the five sources in the Réduit and Pamplemousses experiments.

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* Annual Report of the Sugarcnae Research Station for 1938 (page 57).

There was no significant difference between any of the sources in the three Latin Squares as regards the percentage of total solids in the juice.

4. *Rapid assessment of Ratooning qualities of new cane varieties.*— Three small experiments have been laid down at the Experiment Stations for rapidly evaluating the ratooning power of sugarcane varieties. To begin with, the following known varieties have been included in the experiments :—

M. 188/33	...	...	Weak ratooner
M. 171/30	...	...	Medium ratooner
M. 63/39	...	...	Strong ratooner
M. 134/32 (Standard)	...	...	Strong ratooner

The canes will be cut several times during the year and will be generously fertilized.

The ratooning power is being tested under high and medium rainfall at Hermitage and Réduit respectively, and under irrigation at Pamplemousses. If the method proves satisfactory, the experiment will be conducted with new varities to gauge rapidly their ratooning qualities.

5. *Correlation Studies.*—The following data have been collected for every sample, whether from variety or manurial trials, analysed during the 1951 crop : density Brix, refractometer Brix and C.C.S The calculation of the correlation between these variables entails much arithmetical work and will be done later. In all, 378 figures are available.

Export of Cane, Fuzz and Pollen

Cuttings of several sugarcane varieties have, on request, been exported by air to the following countries : —

Nosi-Bé, Pakistan, Cyprus, Reunion Island, Dzaouzi (Comoro), Martinique and Guadeloupe. A consignment of M. 134/32 cuttings was, in addition, shipped to Seychelles for planting for bacca production.

Fuzz from 10 prolific crosses was despatched by air to Pakistan. Pollen from three male parent varieties was despatched in a thermos-flask by air freight to Mount Edgecombe, South Africa, for crossing purposes. The experiment has been a failure due to the fact that the journey took longer than expected and that the ice had melted completely.

Imported Varieties

The varieties imported from U.S.A., and South Africa, namely, C.P. 34–120, C.P. 36–13, C.P. 36–105, M. 336, M.L. 3–18, P.R. 905, Co. 419 and Co. 421, have been released from quarantine and planted in the open in December 1951. The stumps have been kept in the greenhouse and have been copiously fertilized so as to yield a further supply of planting material as quickly as possible.

Gardens Show

The Cane Breeding Section was one of the centres of attraction at the Gardens Show held at the Royal Botanical Gardens, Pamplemousses, in June 1951. The specimens on display gave a brief but comprehensive picture of the most important aspects of sugarcane breeding as carried out in this Colony.

A. DE SORNAY,
Plant Breeder.

PART II.—CHEMISTRY DIVISION

The staff position of the Division was improved during the year under review, by the appointment of Mr. L. C. Figon, as Scientific Assistant on the 9th April. Such appointment was quite opportune as it was becoming very difficult to cope singlehanded with the work in progress.

The analyses of cane samples from the Variety trials and from other field experiments which were hitherto carried out by an Officer of the Extension Service were entrusted to the care of the Chemistry Division and the newly appointed Scientific Assistant was put in charge of the work during the whole crop.

The factorial fertilizer experiments were harvested in 5th ratoons and the results are presented in this report. Out of the initial series of eighteen trials, only seven remain.

The main item of work, this year, has been the establishment of more Lime and Magnesia trials in the humid and superhumid zones of the island. Nine such trials have been established, thus bringing the total number of lime trials to be harvested in 1952 to fifteen.

Fertilizer Trials on Estates

As mentioned above, only seven of this series of trials could be harvested, the remainder having been abandoned for one reason or another.

The main object in view in establishing this series was to obtain sufficient data which would allow the nutrient status of the cane plant, as tested by the foliar diagnosis technique, to be rightly interpreted.

The series has, in fact, more than served its purpose. It has shown:—

(*a*) That below a certain optimum content of the leaf punch in N, P_2O_5 and K_2O, an application of the appropriate fertilizer will not only result in raising the content, in the leaf, of the nutrient thus applied but will also raise the yield of cane.

(*b*) That a big response is always obtained following the application of Nitrogen.

(*c*) That estates' soils have on the average a rather good status in available Phosphate and Potash, which the very small response to application of these nutrients tends to prove.

(*d*) That no benefit is derived from the application of pen manure at planting whenever a normal fertilization is given to the sugarcane crop.

This year, these trials were harvested in fifth ratoons. The fertilizers applied were the same as for the previous ratoons.

The results are presented in Table I below, together with the corresponding index of Vegetative growth :—

TABLE I

RESULTS OF FACTORIAL FERTILIZER EXPERIMENTS (1951)

Locality	*Nitrogen*			*Phosphoric Acid*			*Potash*			*Response in tons to*			*Sig. diff. 20:1*	*Standard Error % Mean*
	0 N	*1 N*	*2 N*	*0 P*	*1 P*	*2 P*	*0 K*	*1 K*	*2 K*	*N*	*P*	*K*		
Britannia	100	129	139	100	113	115	100	93	99	+ 7·4	+3·1	−0·3	±3·3	14·1
Benarès	100	146	147	100	105	97	100	102	104	+ 8·7	−0·8	+0·9	±2·7	11·2
Savinia	100	128	140	100	108	105	100	120	112	+ 9·4	+1·5	+3·1	±4·9	17·0
Riche en Eau	100	154	166	100	102	101	100	110	108	+14·7	+0·4	+2·4	±3·6	11·6
Beau Vallon	100	167	210	100	115	99	100	103	103	+13·8	−0·1	+0·6	±3·5	17·5
Savannah	100	150	163	100	95	106	100	100	96	+10·8	+1·5	−1·0	±3·5	14·0
Beau Champ	100	113	120	100	104	99	100	99	99	+ 5·2	−0·4	−0·4	±3·7	12·8
GENERAL AVERAGE ...	19·8	27·4	29·8	25·0	26·3	25·7	25·1	26·1	25.8	+10·0	+0·7	+0·7	—	14·0
Comparative yield ...	100	138	150	100	105	103	100	104	103	—	—	—	—	—
Vegetative growth index...	100	121	135	100	101	101	100	101	104	—	—	—	—	—

Reference to the above table shows that all the responses to Nitrogen are significant; the average response for the series is very high and amounts to 10 tons of cane.

In one case there is a high response to phosphate and in another case, a high response to potash, but these responses failed to reach significance on account of the high error attached to these trials.

The average responses to phosphate and potash for the series amount only to 0·7 ton per arpent.

Effect of Differential Fertilization on Sugar Content of Sugarcane

Composite samples of cane collected from the factorial fertilizer experiments were analysed for sugar, as usual.

The summarized data for the series are given below :—

	Nitrogen			*Phosphoric Acid*			*Potash*		
	0 N	*1 N*	*2 N*	*0 P*	*1 P*	*2 P*	*0 K*	*1 K*	*2 K*
C. C. S. % Cane ...	12·73	12·63	12·68	12·53	12·10	12·35	12·45	12·80	12·58
Tons sugar per arpent	2·52	3·46	3·78	3·13	3·18	3·17	3·12	3·34	3·25
Comparative yield of sugar	100	137	150	100	102	101	100	107	104

If the C. C. S. figures for the six crops are considered, the following average figures are obtained which show the effect of the different fertilizers on the sugar content of sugarcane :—

COMMERCIAL CANE SUGAR % CANE

	Nitrogen	*Phosphoric Acid*	*Potash*
0. ...	12·92	12·63	12·58
1. ...	12·77	12·68	12·79
2. ...	12·61	12·67	12·64

The above figures suggest a slight increase in sugar content due to Potash application, whilst they show a definite decrease in C.C.S. content with increased Nitrogen application.

However, it is worth mentioning at this stage that, if reference is made to the C.C.S. figures for the previous years, it is seen that this deleterious effect of heavy Nitrogen fertilization on the sugar content of sugarcane shows a tendency to decrease in old ratoons.

Lime Trials

This series consists of four factorial experiments and two latin squares.

The factorial experiments, on a 3×3×3 layout with every combination of Lime, Potash and Magnesia at three levels each, were harvested in second ratoons.

No lime was applied in ratoons, and the lime effect is therefore the residual effect of the lime application at planting. The potash and magnesia applications were the same as for the previous year.

The results of the factorial lime experiments are given below :—

RESULTS OF FACTORIAL LIME EXPERIMENTS (1951)

	Lime			*Potash*			*Magnesia*		
	0 Ca	*1 Ca*	*2 Ca*	*0K*	*1 K*	*2 K*	*0 Mg*	*1 Mg*	*2 Mg*
Riche Bois ...	100	97	94	100	99	104	100	104	97
Bénarès	100	106	109	100	98	98	100	105	109
Henrietta	100	104	106	100	112	110	100	97	97
Olivia	100	92	99	100	98	100	100	96	97
Average in tons/ arpent	31·2	31·3	31·7	30·8	31·4	31·9	31·4	31·5	31·3
Comparative yield	100	100	102	100	102	104	100	100	100

Reference to the above table shows an average gain of half a ton of cane due to lime applied at the rate of 3 tons per arpent at planting, and no response to magnesia application.

The latin squares do not include a Potash treatment, the only treatments apart from the control, being Lime alone, Magnesia alone, and the two combined. The quantities and forms of fertilizers applied were :—

3 tons of slaked lime per arpent to the "Ca" plots and 50 kgs. of Sulphate of magnesia per arpent to the "Mg" plots.

These trials were harvested in virgins and yielded results of the same trend as those obtained from the series of factorial experiments, showing a positive response of 0·4 ton of cane to lime application, and a negative response of 0·2 ton of cane per arpent to magnesia.

Sugar analyses made on composite samples of cane from the factorial experiments gave the following average results :—

	Lime			*Potash*			*Magnesia*		
	0	*1*	*2*	*0*	*1*	*2*	*0*	*1*	*2*
C.C.S. % cane (1951) ...	12·0	12·6	13·0	12·1	12·8	13·2	12·6	13·8	13·5
Tons Sugar per arpent ...	3·74	3·93	4·12	3·73	4·02	4·21	3·96	4·35	4·23
Average C.C.S. for 3 crops	13·73	13·86	13·89	13·89	13·91	14·37	13·94	14.10	14·09

If the C.C.S. figures for the two series of lime trials are considered together, the following, being the average of 15 experiments, are obtained : —

	C.C.S. % Cane
Lime..	13·38
No Lime	13·38
Magnesia	13·63
No Magnesia ...	13·45

It may be inferred from the above figures that lime, at the rate of 3 tons of slaked lime per arpent does not seem to have any effect on the sugar content of sugarcane, whereas magnesium applied as sulphate of magnesia may cause a slight improvement of the sugar content. No definite conclusions can be drawn in this respect until more data become available.

Leaf punches were collected from the lime trials during the virgin and the two ratoon crops. These punches were analysed for N, P_2O_5, K_2O, CaO and MgO. Arising out of the results, it seems that the application of Magnesia did not alter the content of the leaf punches in the above mentioned nutrients.

Lime application on the other hand, whilst having no effect on the N and MgO content of the leaf punch, has favoured a higher concentration of P_2O_5 and CaO and at the same time has lowered the K_2O content, the average figures for the 3 crops being:

% DRY MATTER OF LEAF PUNCH

	P_2O_5	CaO	K_2O
0 Ca	0·48	0·58	1·70
1 Ca	0·50	0·62	1.58
2 Ca	0·52	0·62	1·60

Permanent Trials at C.E.S.

Bio 5

A fourth rotation of this trial was started, on the same layout as the previous one, with the variety M. 423/41.

Below are the results of the virgin crop:—

	Tons cane per arpent	*Comparative yield*
Complete Fertilization ...	38·5	100
Minus Phosphate	27·5	71
Minus Potash	11·2	29

The results show the extent to which the fertility of a soil can be lowered by about fifteen years of unbalanced fertilization through the omission of one nutrient from the fertilizer mixture.

Trial 69

The object of this trial is to compare the varieties M. 423/41 and M. 134/32 at two levels of fertilization. The high fertilization consists of 60 Kgs N, 75 Kgs P_2O_5 and 60 Kgs. K_2O per arpent and is as much as four times the low fertilization.

The results of the first ratoon crop are given below:—

TONS CANE PER ARPENT

	High Fertilization	*Low Fertilization*	*Response to Higher Level*	*Average*
M. 423/41	49·6	20·7	+28·9	35·2
M. 134/32	37·9	20·8	+17·1	29·4
M. 423/41 compared to M. 134/32	+11·7	− 0·1		

It is seen, from the above figures, that, whereas the two varieties gave the same yield at the low level of fertilization, yet, at the higher level, M. 423/41 outyielded M. 134/32 by almost 12 tons. These results compare well with those of last year and confirm that M. 423/41 responds better to a high fertilization than M. 134/32.

Fertilizing Value of Crushed Basalt

The $3 \times 2 \times 2$ factorial experiment at Hermitage was harvested in 3rd ratoons with the following average results :—

	Tons cane per arpent
OB.—No Basalt	33·0
1B.— 91 Tons Basalt/arpent ...	36·2
2B.—182 Tons Basalt/arpent ...	38·1
Significant diff. (20 : 1)	± 4·7

The above figures show that the double dose of basalt has, once more, significantly increased the yield of cane.

The following figures give the yield produced by the two varieties and by the two levels of fertilization :—

	Tons cane per arpent		*Tons cane per arpent*
M. 134/32	36·2	Single Fertilization ...	34·9
M. 63/39	35·3	Double Fertilization ...	36·7
Sig, Diff. (20 : 1)	± 3.9	Sig. Diff. (20 : 1)	± 3·9

Reference to the above figures shows that the two varieties have put up, this year, an equivalent performance, and that the difference in favour of the double fertilization is not significant.

The following table gives the average response to applications of basalt for the four crops :—

TONS CANE PER ARPENT

	0 B	*1 B*	*2 B*	*Response to 2 B*
Virgin crop	31·9	33·6	36·3	+ 4·4
1st Ratoon	26·7	29·8	32·6	+ 5·9
2nd Ratoon	32·4	34·2	37·3	+ 4·9
3rd Ratoon	33·0	36·2	38·1	+ 5·1
TOTAL FOR 4 CROPS ...	124·0	133·8	144·3	+20·3

These figures show a total gain of 20·3 tons of cane for 4 crops, following a single application of basalt at planting.

It is interesting to note that the yearly response to basalt shows no indication to fall down, at this stage ; this means that the basalt is still exerting its full effect and may continue to do so for many years to come.

The following table gives the C.C.S. content of composite samples of cane from the basalt experiment and also the average content for the four crops : –

C.C.S. PER CENT CANE

	3rd Ratoon	*Average 4 crops*
0 B ...	10·48	11·01
1 B ...	11·05	11·34
2 B ...	10·62	11·13

Again, there seems to be a slight indication that the application of basalt may improve the sugar content of sugarcane.

Vegetative Growth Index

In a previous report, the attention of experimentators, on estates was drawn to the fact that the index of vegetative growth might be used with advantage in experimentation, in lieu of controlled harvesting and weighing of each plot separately. This index, it will be recalled, consists in taking the weight of 30 leaves of 3rd rank collected at random from each plot of the trial ; the weight thus obtained considered as a percentage of that of the control shows the same trend as the actual yield of cane at harvest. Figures were published showing the high correlation existing between this index and the actual yield in the series of fertilizer experiments.

It follows that each time the application of a fertilizer causes the weight of the leaf to increase, the yield of cane too increases.

It was noticed, however, that such is not the case in basalt experiments and though very high increases in yield were obtained, these increases were not reflected in the weight of the leaf, as the following average figures for M. 134/32 for the 4 crops will show :—

	Comparative yield	*Vegetative growth index*
0 B ...	100	100
1 B ...	105	100
2 B ...	114	102

Further, investigations revealed the fact that whereas in fertilizer experiments, the increase in yield is due primarily to healthier and bigger canes with corresponding bigger leaves, the increased yield following basalt application is primarily due to a greater number of canes per arpent.

A count was made in the O B and 2 B plots of the Hermitage trial and gave the following results :—

	No. of shoots per arpent
0 B ...	25,000
2 B ...	27,300

As it is seen, this surplus number of shoots amounts to nearly 10 per cent, a figure which is most probably significant.

Foliar Diagnosis

Leaf punches collected, this year, from the factorial fertilizer experiments were analysed for N, P_2O_5, and K_2O. In addition K_2O determinations were also carried on samples collected in 1949 and 1950 which could not be analysed then.

Nitrogen.—The average figures for Nitrogen content of the leaf punches for the series are given below. It will be remembered that all the trials responded to Nitrogen fertilization :—

N. applied in kgs/arpent	*N. % dry matter leaf punch*	*Tone Cane per arpent*	*Comparative yield*
0	1·19	19·8	100
30	1·47	27·4	138
60	1·64	29·8	150

The figure 1·65 per cent dry matter ot the leaf punch suggested last year as the optimum for N is maintained.

Phosphate.—The following table gives data in connection with 3 rials which responded to phosphate application :—

P_2O_5 applied in kgs per arpent	P_2O_5 % dry matter leaf punch	Tons Cane per arpent	Comparative yield
0	0·34	22·4	100
25	0·42	25·1	112
50	0·43	24·7	110

The other trials showed no response to phosphate and below are the data connected with these trials :—

P_2O_5 applied in kgs. per arpent	P_2O_5 % dry matter leaf punch	Tons cane per arpent	Comparative yield
0	0·44	26·8	100
25	0·50	27·2	101
50	0·49	26·9	100

The above two tables confirm the optimum already adopted for P_2O_5 which is 0.45 per cent.

Potash.—The following table gives the data connected with the trials which have responded to potash for the last three years :—

Year	No. of trials	K_2O % dry matter of leaf punch			Comparative yield		
		0K	1K	2K	0K	1K	2K
1949	5	1·40	1·67	1·64	100	103	107
1950	5	1·41	1·62	1·71	100	107	105
1951	3	1·37	1·63	1·72	100	113	110
AVERAGE OF 13 TRIALS		1·40	1·64	1·69	100	107	107

In cases where the yield figures were not available, the vegetative growth index was used instead.

Trials showing no response to Potash yielded the following data :—

Year	No. of trials	K_2O % dry matter of leaf punch			Comparative yield		
		0 K	1 K	2 K	0 K	1 K	2 K
1949	10	1·69	1·64	1·78	100	98	102
1950	9	1·63	1·72	1·77	100	98	99
1951	5	1·49	1·72	1·70	100	99	100
AVERAGE OF 24 TRIALS ...		1·62	1·69	1·76	100	98	100

Reference to the above figures shows that in spite of the fact that K_2O content of leaf increases with Potash application, no increase in yield is obtained when the initial content is 1·49 per cent.

On the other hand, with an initial content of 1·40 per cent a slight response is obtained. Considering these two factors, the optimum suggested for K_2O will be 1·45 per cent.

In conclusion, the above foliar diagnosis studies indicate the following figures as being the content in N, P_2O_5 and K_2O below which an increase in yield is to be expected after application of the appropriate fertilizer : —

	Per cent dry matter of leaf punch
N	1.65
P_2O_5 ...	0·45
K_2O	1·45

Varietal difference.—Leaf punches collected from Variety trials were also analysed for N, P_2O_5 and K_2O so as to compare the foliar diagnosis of M. 423/41 and Ebene 1/37 to that of M. 134/32.

The average figures to date are :—

	Comparison between M. 423/41 and M. 134/32 Average of 32 trials				*Comparison between Ebene 1/37 and M. 134/32 Average of 14 trials*			
		N	P_2O_5	K_2O		*N*	P_2O_5	K_2O
M. 423/41	...	1·34	0·56	1·80	Ebene 1/37	1·31	0·51	1·80
M. 134/32	...	1·35	0·57	1·85	M. 134/32	1·37	0·57	1·80

The above figures show that the variety M. 423/41 is comparable to M. 134/32 in N, P_2O_5 and K_2O content of the leaf punch.

Figures for Ebene 1/37 suggest that in spite of its K_2O content being equal to that of M. 134/32 that variety may have a lower content in N and P_2O_5.

Sydney M. Feillafé.
Acting Chemist, S.R.S

PART III—BOTANY DIVISION

Owing to shortage of staff the research programme of the Botany Division had to be curtailed. The Scientific Assistant, Mr. J. Fakim, was promoted to the post of Assistant Land Officer in September and the writer appointed to fill the vacant post was entrusted with the carrying out of the routine work of the Division. No new experiments on chemical weed control were carried out.

Root Pruning as a Test to Clemora Smithi Resistance

A root pruning test based on the method evolved by Dr. Evans (*vide*: Annual Reports S.R.S.; 1938, 1950) was made on the following Barbados cane varieties, B. 3337, B. 34104, B. 37161 and B. 37172, with a view to assessing their resistance, relatively to M. 134/32, to the eating action of the grubs of *Clemora Smithi*. The number of new roots formed as a result of the root pruning treatment for each variety are given below:—

Category	*Variety*	*Average No. of new roots per cane*			
		Before pruning	*After 1st pruning*	*After 2nd pruning*	*After 1st and 2nd prunings*
VIRGINS ...	M. 134/32 ...	8	63	39	102
,, ...	B. 3337 ...	6	78	12	90
,, ...	B. 37161 ...	7	35	48	83
1ST RATOONS ...	M. 134 32 ...	7	22	29	51
,, ...	B. 3337 ...	6	6	16	22
,, ...	B. 37161 ...	8	7	9	16
,, ...	B. 37172 ...	3	25	17	42
2ND RATOONS ...	M. 134/32 ...	7	28	14	42
,, ...	B. 3337 ...	8	20	20	40
,, ...	B. 34104 ...	11	15	5	20
,, ...	B. 37161 ...	14	12	22	34
,, ...	B. 37172 ...	8	30	23	53
3RD RATOONS ...	M. 134/32 ...	3	25	33	58
,, ...	B. 3337 ...	6	15	26	41
,, ...	B. 34104 ...	3	5	19	24
,, ...	B. 37161 ...	10	12	7	19
,, ...	B. 37172 ...	3	29	24	53

From the above table the following figures may be obtained:—

Category	*Total No. of New roots that emerge per cane after pruning*				
	M. 134/32	*B. 3337*	*B. 34104*	*B. 37161*	*B. 37172*
Virgins	102	90	—	83	—
1st Ratoons	51	22	—	16	42
2nd Ratoons	42	40	20	34	53
3rd Ratoons	58	41	24	19	53
TOTAL ...	253	193	44	152	148

The results obtained in that experiment show that M. 134/32 is more resistant to the eating action of the grubs of *Clemora Smithi* than the Barbados cane varieties B. 3337 and B. 37161. The variety B. 37172, however, gave in first, second and third ratoons results comparatively similar to M. 134/32. As the experiment was carried out on but a limited number of cane stools, further data are required before it is possible to assess their resistance in that respect.

Pre-treatment of Sugarcane Cuttings

Three trials were established in different locatities with a view to testing the efficiency of Aretan relatively to Agallol, a product of the Farbenindustrie, Germany. These experiments consisted of three treatments in each of twelve randomized blocks. The Plant Pathology Division of the Department has been responsible for the assessment of pineaple disease incidence.

The results obtained are summarised below :—

Locality	*Treatments*	*No. of germinated cuttings/plot Max. No. 180*	*Total length of shoot in cm. per plot*	*No. of cuttings infected with pineapple disease per plot*
Reduit Experimental Station	Control	104	432	129
	Aretan 1 per cent	161	1000	34
	Agallol 1 per cent	162	1011	42
Plaines Wilhems Experimental Station	Control	142	556	67
	Aretan 1 per cent	173	829	10
	Agallol 1 per cent	168	758	18
Pamplemousses Experimental Station	Control	65	303	124
	Aretan 1 per cent	143	880	32
	Agallol 1 per cent	134	757	26
Mean of the 3 Trials ...	Control	103	430	106
	Aretan 1 per cent ...	159	903	25
	Agallol 1 per cent	154	842	28

The above figures show that Aretan and Agaloll gave comparatively similar results in their use as sugarcane disinfectants.

Investigations on yield effects of interplanting foodcrops with sugarcane

The three trials laid down in 1949 were harvested this year in first ratoons. Of the five experiments established in 1950, one was harvested by the estate itself without the plot yields being recorded, so that only results from four trials were obtained in 1951.

Thirteen new experiments have been planted out this year. Each consists of two treatments, without replication, of sugarcane alone and sugarcane interplanted with a crop in alternate interlines.

The results obtained in 1951 are summarised below :—

PLAINES WILHEMS EXPERIMENTAL STATION—TRIAL NO. 1

Time of planting: Sugarcane (variety M. 134/32) beginning of September 1950.

Time of planting: Foodcrops: immediately; 15 days and one month after. Foodcrop interplanted: Maize.

Growth.—The maize seedlings were at first checked in their growth by a slight attack of borers, but the plants subsequently recovered and made a rather fair establishment.

Harvest.—The canes were harvested at the end of October, that is, about 14 months after planting. The results obtained were the following :—

Treatment	*Yield in tons per arpent*
1. Sugarcane alone	19·9
2. Sugarcane with maize in alternate interlines planted immediately ...	19·4
3. Sugarcane with maize in alternate interlines planted 15 days after ...	16·8
4. Sugarcane with maize in alfernate interlines planted one month after ..	19·0
Significant difference (P=0.05) ...	± 3·4

Maize gave the following average yield per arpent :—

Treatment	*Kgs.*
2	261
3	370
4	370

PLAINES WILHEMS EXPERIMENTAL STATION (TRIAL NO. 2)

Time of planting : Sugarcane (Variety M. 134/32) : end of April 1950.

Time of planting : Foodcrops : mid-May 1950.

Foodcrops interplanted : Dholl Kessari, Potatoes.

Growth.—The potato plants made good growth. They were sprayed fortnightly with the fungicide Soltosan, as a preventive measure against Potato blight disease. Dholl Kessari grew fairly well.

Harvest.—The canes were harvested at the end of August 1951 after about 16 months growth. The results obtained are given below :—

Treatment	*Yield in tons/arp.*
1. Sugarcane alone	31·7
2. Sugarcane with potatoes planted in alternate interlines	33·7
3. Sugarcane with dholl Kessari in alternate interlines...	31·4
4. Sugarcane with dholl Kessari in one interline and potatoes in the other ...	35·6
Significant Difference (P=0·05)	± 6·5

Average yields of foodcrops in Kgs per arpent are given below :—

Treatment	*Potatoes*	*Dholl Kessari*
2	2137	—
3	—	67
4	2250	37

BRITANNIA S.E.

Time of planting : Sugarcane (Var. M. 134/32): mid March 1950.

Time of planting : Foodcrops : immediately ;
15 days after.

Foodcrop interplanted : Maize.

Growth.—Apart from a slight attack by borers the maize plants made good growth. When the ears started maturing they suffered from an attack by birds and this evidently caused a reduction in yield of that crop.

Harvest.—The canes were harvested at the end of August 1951, that is, about 17 months after planting, and the following yields were obtained.

Treatment	*Tons canes per arpent*
1. Sugarcane alone	44·6
2. Sugarcane with maize in alternate interlines planted immediately ...	47·4
3. Sugarcane with maize in every third lines planted immediately	44·4
4. Sugarcane with maize in alternate interlines planted 15 days after ...	51·0
5. Sugarcane with maize in every three lines planted 15 days after	41·2
Significant difference (P=0·05) ...	± 2·2

Average yields of maize per arpent are given below :—

Treatment	*Kilogs*
2	90
3	100
4	110
5	122

MON DESERT—MON TRESOR S. E. TRIAL No. 1

Time of planting : Sugarcane (Variety M. 134/32) : beginning of march 1950.

Time of planting : Foodcrops : immediately ; 15 days and 1 month after.

Foodcrop interplanted : maize

Growth.—The young maize seedlings were damaged by birds which uprooted them to eat the seeds soon after germination. Recruiting had therefore to be done on more than one occasion and as a result a certain number of missing holes occurred in all the plots.

Harvest.—The canes were harvested at mid-August after about 17 months growth. The results obtained were the following :—

Treatment	*Yield in tons/arp.*
1. Sugarcane alone	35·5
2. Sugarcane with maize in alternate interlines planted immediately ...	36·3
3. Sugarcane with maize in alternate interlines planted 15 days after ...	37·8
4. Sugarcane with maize in alternate interlines planted one month after ...	38·6
Significant difference (P=0·05)	± 3·9

Average yields of maize in kgs per arpent are given below :

Treatment	*Kgs.*
2	204
3	228
4	203

MON DESERT—MON TRESOR S.E.—TRIAL NO. 2

Date of harvesting (*a*) Virgin canes: August, 1950.
(*b*) ratoon canes: October, 1951.

Sugarcane variety : M. 63/39.
Foodcrop interplanted : Maize.

Treatment	*Tons cane per arpent*	
	Virgins	*First Ratoon*
1. Sugar alone	54·9	49·5
2. Sugarcane with maize in alternate interlines planted immediately ...	47·1	50·0
3. Sugarcane with maize in every interline planted immediately	47·8	48·6
Significant difference (P = 0·05) ...	±20·6	±17·8

PETITE ROSALIE S.E.

Date of harvesting (*a*) virgins canes : August, 1950.
(*b*) ratoon canes : August, 1951.

Sugarcane variety : M. 134/32.

Foodcrops interplanted : maize and tomatoes.

Treatment	*Tons cane per arpent*	
	Virgins	*First Ratoon*
1. Sugarcane alone	37·0	35·2
2. Sugarcane with maize in alternate interlines	39·9	34·1
3. Sugarcane with omatoes in alternate interlines	38·3	34·5
4. Sugarcane with maize in one interline and tomatoes in the other ...	43·9	39·3
Significant difference (P = 0·05)	± 9·3	± 4·4

ST. ANDRÉ S.E. (SOLITUDE)

Date of harvesting *(a)* virgin canes : August, 1950
(b) ratoon canes: October, 1951

Sugarcane variety : M. 134/32

Foodcrops interplanted: Maize and dholl Kessari

Treatment	*Tons cane per arpent*	
	Virgins	*First Ratoon*
1. Sugarcane alone	23·8	34·8
2. Sugarcane with maize in alternate interlines	23·0	32·6
3. Sugarcane with dholl Kessari in alternate interlines ...	23·5	33·4
4. Sugareane with maize in one interline and dholl Kessari in the other	26·4	34·7
Significant difference (P = 0·05)	±2·9	±3·9

From the data obtained this year the following observations emerge :—

1. Delaying the planting of maize until a fortnight after the canes have been planted has reduced the cane yield in Trial No. 1 of Plaines Wilhems Experimental Station. Curiously enough in those of Mon Desert—Mon Tresor (Trial No. 1) and Britannia an increase in cane yield was obtained.

2. In the trials at Mon Desert—Mon Tresor (Trial No. 2) and St. André, cane yield was not affected in first ratoon ; but in the Petite Rosalie experiment an increase was recorded in the treatment : maize in one interline and tomatoes in the other interline.

Field Trials on Secondary Crops

Linseed.—Variety-and-time-of-planting trials were laid down at the three Experimental Stations : Reduit, Pamplemousses and Plaines Wilhems. Unfortunately the experiments were ruined owing to the high rainfall experienced during the planting season. As a result, no data were obtained on that crop this year.

Rice—Oats.—Experiments in the form of $2N \times 2P \times 2K$ were laid down this year on these foodcrops at Reduit and Plaines Wilhems Experimental Stations.

FERTILIZATION

	Fertilizers in kgs per arpent		
Foodcrops	*Nitrogen at levels*	*Phosphate at levels*	*Potash at levels*
Oats	nil and 25	nil and 100	nil and 25
Rice	nil and 75	nil and 250	nil and 110

The nitrogen, phosphate and potash were given in the form of sulphate of ammonia, phosphatic guano and muriate of potash respectively.

GROWTH

Oats.—A trial was planted at mid-June at the Plaines Wilhems Experimental Station and the other at Réduit at the beginning of July Both trials showed good growth.

Rice.—The experiment was planted out at the end of January. Apart from a slight attack by borers in the seedling stage, the trial made fair growth.

Harvest

TABLE I

	Yield in kilogs per arpent		
Treatment	*Plaines Wilhems Exp. Station*	*Reduit*	*Plaines Wilhems Exp. Station*
	Oats		*Rice*
O	837	735	365
N	731	718	341
P	852	715	437
K	745	731	430
NP	719	769	375
NK	754	678	276
PK	741	673	618
NPK ...	763	731	438
Significant Diff: (P=0.05)	±333	±177	±267

TABLE II

Treatment	Response in Kilogs per arpent		
	Plaines Wilhems Exp. Station	Reduit	Plaines Wilhems Exp. Station
	Oats		Rice
Nitrogen ...	− 52	+ 10	− 120
Phosphate ...	+ 2	+ 7	+ 118
Potash ...	− 32	− 31	+ 60

Conclusion

From the figures in Table I, it emerges that there has been no response to the complete fertilization with both foodcrops, but that rice has responded to the PK treatment.

From Table II, it may be observed that, for rice, a high positive response was obtained with phosphate and potash and with oats a negative response for potash in both localities.

Groundnuts

A 3N × 3P × 3K experiment was laid down in mid-December with the variety Vigan Lupog, at Plaines Wilhems experimental station.

		Fertilizer in Kgs per arpent		
Sulphate of Ammonia	...	nil	100	200
Phosphatic Guano	...	nil	125	250
Muriate of Potash	...	nil	75	150

Growth was satisfactory throughout the growing period. The results obtained were the following :—

	Linear response
Nitrogen	+249
Phosphate	+485
Potash	+ 36
Significant difference (P=0·05) ...	±285

From the above figures it may be observed that a significant positive linear response to phosphate was obtained. Positive responses to nitrogen and potash occurred but they failed to reach significance.

B. NUNDLOLL,
Scientific Assistant.

PART IV—EXTENSION SERVICE

Staff

Mr. Jacques Marot who had been acting as Senior Field Demonstrator as from 26th June, 1950 reverted to his post as Field Demonstrator on 19th February, 1951, when the writer returned from leave and resumed his duties.

From August to December, Mr. M. Sooltangos, Field Demonstrator, worked as Test Chemist for the Central Board in addition to assuming his normal duties.

On September 1st Mr. B. Roy, Field Demonstrator attached to the factory areas of Beau Champ, Queen Victoria, Constance, The Mount and Mon Loisir, left the Extension Service and joined the Agricultural Division; as from the same date, Mr. D. Reetoo has taken over the first three factory areas mentioned, and Mr. J. B. de Gersigny the two others.

Activities

Following the usual policy, the main activities of the Extension Service have consisted in intensive propaganda by means of lectures, demonstrations and frequent visits to planters in their fields. It has been possible to note a marked improvement in the methods of cultivation of a large number of small planters as well as of bigger planters. On the other hand, in some districts small planters do not seem to make a serious effort to improve their cane yields.

An increasing proportion of small planters are now applying complete fertilizers to their fields while in some regions nitrogenous fertilizers are still being used exclusively. The outstanding yields obtained last year by some of the more advanced small planters who had followed the advice of the Extension Service are helping definitely the Field Demonstrators in their propaganda work.

Demonstration Plots

A. Artificial Fertilizers

A total of 40 plots, comprising a balanced fertilization versus the normal small planter's treatment of the respective localities were being followed at the beginning of the year. However only 29 of those plots could be harvested and weighed under our supervision the others being discarded, on account of uncontrolled applications of fertilizers made by the owners of the plots, or having been harvested without notice.

The results of these demonstrations have shewn that phosphate deficiencies are more numerous and usually more marked than potash deficiencies. In some cases the balanced fertilization has brought about increases in cane yield of over 75% as compared with the small planter's treatment.

24 new plots have been established in various localities during the year.

A. New Varieties

Five plots including M. 423/41 and M. 134/32 and three others including Ebene 1/37 were also harvested during the year. These plots were situated in different regions of the island and, were in all cases, under the control of Co-operative Credit Societies. The sugarcane Research Station supplied the planting material in each case, and it was agreed that the Co-operative Credit Societies would be responsible for the distribution of the canes to planters at a reasonable rate; except in one case, no difficulty was experienced in the fulfilment of this last condition.

In every case, M. 134/32 proved inferior to M. 423/41 but not to Ebene 1/37. It must be noted, however, that in the ratoon crop, at the time of writing, Ebene 1/37 seems the most promising while M. 423/41 is somewhat erratic.

During the year under review, three new plots including the same three varieties have been planted.

C. Fungicides

In addition to twelve plots specially laid down to demonstrate the beneficial effect of Aretan on the germination of cane cuttings, small scale demonstrations for the same purpose have been laid down beside all plantations made under our control on small planter's lands. The success of these demonstrations has been much appreciated by planters; many of them are now treating their planting material with Aretan or Agaloll.

The Extension Service has enabled about 140 small planters to to obtain the fungicides in small quantities according to their requirements.

D. Weed Killers

The use of chemicals for the destruction of weeds in cane fields has not, up to now, met with much favour on the part of small planters; the reasons for this are:—

(*a*) The high initial cost of the necessary equipment.

(*b*) The difficulty in obtaining such equipment.

(*c*) The necessity for a certain degree of organisation for the efficient preparation and application of the weedicides.

Only 15 planters have actually applied to the Sugarcane Research Station for obtaining chemical weed killers. In each of these cases the Field Demonstrators have been helping the planters with advice and, whenever possible, have provided the equipment.

It must be noted, however, that during the recent weeks, small planters have been showing a growing interest in chemical weed control, probably due to the prevailing high cost of labour. A total of 36 demonstrations have been made in this connection during the year.

E. Meetings

A large number of small planters have been contacted by the Field Demonstrators at the 117 meetings organised during the year; the cooperation of Village Councils and Cooperative Credit Societies has been much appreciated in these circumstances.

The meeting were usually held in Village Council Halls, in the Headquarters of local Cooperative Credit Societies, in Club Houses etc. and whenever convenient on the site of Demonstration Plots where small planters could see in the field the advantages of the methods advocated by the Sugarcane Research Station. All the Agricultural problems connected with the cultivation of sugarcane by small planters were treated in the lectures delivered at these meetings. The various items dealt with were, whenever possible, illustrated by means of charts, specimens and simple indoor demonstrations.

Foliar Diagnosis

The leaf samples taken from the fields of small planters have, on the average, shown less potash deficiencies than last year. On the other hand the Nitrogen deficiencies have been more marked than last year; this according to Mr. P. Halais, Chemist of the Sugar Industry Reserve Fund's laboratory, who performed the analyses, is due to the fact that the samples had not been dried early enough after being collected; special attention will be given to that factor in future.

A comparatively large number of phosphate deficiencies have also been noted. This can be explained by the fact that small planters have only just started to apply phosphatic guano at planting so that most of their fields are still very deficient in phosphate and are likely to remain thus until they are replanted.

A total of 240 samples have been taken from small planters' fields during the year. The Field Demonstrators have in addition assisted several big planters in the collection of leaf samples from their fields.

F. Soil Erosion

On the occasion of the Agricultural Show held at Pamplemousses in June last, a stand was erected in co-operation with the Chemistry Division of the sugarcane Research Station in order to illustrate the comparative effects of heavy rains on well cultivated and on badly cultivated sloping land. The public showed much interest in this exhibition. After the Show the stand was carried for demonstration to the five centres indicated below, where plantations are severely affected by soil erosion. In each of these centres, the demonstrations were accompanied by appropriate lectures delivered by Field Demonstrators.

The stand has been exhibited at :—

(*a*) Montagne Longue market place from 11–7–51 to 18–7–51
(*b*) Chemin Grenier Government School „ 18–7–51 „ 27–7–51
(*c*) Vieux Grand Port „ „ „ 27–7–51 „ 8–8–51
(*d*) Grand Sable „ „ „ 8–8–51 „ 22–8–51
(*e*) Quatre Sœurs (centre village) „ 22–8–51 „ 7–9–51

In all cases the dcmonstrations have been followed with great interest and quite a number of planters have adopted immediately the methods recommended.

G. Distribution of Planting Material

The demand for planting material of M. 423/41 has been rather limited. Only 5000 canes of this variety have been distributed to small planters from the Experiment Stations ; the number canes distributed from the demonstration plots by the Co-operative Credit Societies is estimated at 8,000.

The recently released variety Ebene 1/37 has been in great demand: 36,000 canes of this variety have been distributed to planters for propagation purposes. Highlands S.E. supplied the bulk of the material and collected the proceeds thereof while the extension Service supervised the distribution and made all arrangements connected therewith.

Prohibited Varieties

As far as it has been possible to ascertain, there has been no new plantation of prohibited varieties but there is still a fair area under such varieties in the factory areas of Reunion, Union Flacq and Constance. In the latter area it is estimated that over 350 tons of Uba seedlings have been left in the field after the crop : in the other areas special arrangements in this connection were made between the millers and planters.

Supply of Artificial Fertilizers

Small planters in general have been satisfied with their allocation of fertilizers. The important modifications recently brought to the transport regulations, and authorizing the transport of artificial fertilizers in small quantities by private means, will undoubtedly have a beneficial effect on the cane yields of small planters ; as indicated in the Annual Report for 1949, the transport restrictions limited to a fair extent the use of artificials by these planters.

The analysis of samples taken in the field, from small planters, tend to indicate that there is less fraud now than during the past two years, as far as phosphatic guano is concerned. However the prevailing high cost of sulphate of ammonia is likely to bring about fraudulous transactions in this line ; in one case it was discovered that a planter had been supplied with muriate of potash in lieu of sulphate of ammonia.

OTHER ACTIVITIES

(a) In addition to the activities already mentioned, the officers of the Extension Service made regular visits to planters in their fields; on these occasions they have the best opportunities of correcting many wrong practices and of giving advice to planters. Big planters have in several cases invited the officers of the Extension Service to visit their plantations and advise them accordingly; appreciable improvements have already been derived from these visits.

(b) The advantages of Co-operative Credit Societies have been impressed upon small planters in various localities where these societies did not exist and where shortage of funds and lack of organisation were responsible for the bad management of the sugarcane plantations; this has been the starting point of five of the new Societies established during the year.

(*c*) Over 30 inquiries have been carried out by the Extension Service, on behalf of the Controller of Supplies, respecting applications by traders for permits to sell artificial fertilizers.

(*d*) During the crop, the Field Demonstrators have assisted the other Divisions of the Sugarcane Research Station in harvesting trials, making maturity tests etc.

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